

Salmonellosis (non-typhoidal)

Disease Category: Enteric

Timeframe to follow-up: Within 1 working day

<u>Signs and Symptoms</u>	Symptoms can include sudden onset of diarrhea, abdominal cramps, fever, nausea, and vomiting.
<u>Incubation</u>	Usually 12 to 36 hours but can range from 6 to 72 hours.
<u>Case Classification</u>	Clinical criteria: An illness of variable severity commonly manifested by diarrhea, abdominal pain, nausea, and sometimes vomiting. Asymptomatic infections may occur, and the organism may cause extra-intestinal infections. Laboratory Criteria for Diagnosis Supportive laboratory evidence: Detection of <i>Salmonella</i> spp. in a clinical specimen using CDT. Confirmatory laboratory evidence: Isolation of <i>Salmonella</i> spp. from a clinical specimen. Case Classification Probable • A case that meets the supportive laboratory criteria for diagnosis; OR • A clinically compatible case that is epidemiologically linked to a case that meets the supportive or confirmatory laboratory criteria for diagnosis. Confirmed A case that meets the confirmed laboratory criteria for diagnosis.
<u>Differential Diagnosis</u>	Campylobacteriosis, cryptosporidiosis, cyclospora infection, E. coli infection, listeriosis, shigellosis, vibriosis, yersiniosis
<u>Treatment</u>	Supportive (fluid and electrolyte replacement; If invasive, antibiotics and hospitalization may be required.
<u>Duration</u>	Symptoms usually resolve within 4-7 days.
<u>Exposure</u>	Typically, inadequately cooked or raw meat, poultry, or eggs; food cross-contaminated with risk food; contaminated produce (e.g., sprouts, cantaloupe, tomatoes); unpasteurized milk or milk products; contact with the feces of pets, reptiles, livestock, birds, or other infected animals; contaminated and inadequately treated drinking water. Person-to-person transmission can occur through oral-anal sex.
<u>Laboratory Testing</u>	Nevada State Public Health Laboratory can perform culture and susceptibility testing (https://med.unr.edu/public-health-lab/disease-characteristics/clinical-analysis/culture-stool).
<u>Control of Contacts</u>	• A contact residing in the same household as a case having <i>Salmonella</i> shall not work in a sensitive occupation unless authorized by the health authority.

	○ 1 negative fecal specimen or is asymptomatic and no indication of poor personal hygiene. • A person who excretes <i>Salmonella</i> species for more than 1 year after onset of acute illness is a chronic carrier and shall not engage in a sensitive occupation unless: ○ 3 negative fecal specimens (taken 72 hours apart)
Key areas of focus during investigation	Food history, travel history, and exposure to animals (e.g., pets, livestock, petting zoo, assess for sensitive occupations for case and symptomatic contacts
Public Health Actions	Local Health Authority to notify Office of State Epidemiology (stateepi@health.nv.gov) if outbreak suspected. For individual confirmed or probable cases: • Identify potential exposures • Identify potential outbreaks from common sources • Educate about ways to prevent fecal-oral transmission including hand washing. • Exclude from sensitive occupation or setting such as daycare attendance or work, food handling, or health care until at least 48 hours after diarrhea ends; require 2 negative stools (24 hours apart, at least 48 hours after antibiotics) before returning to risk settings. • Recommend standard and contact precautions.
Key Partner Agencies	• Environmental Health Services • Local Health Authorities • Nevada State Public Health Laboratory

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SALMONELLOSIS (NON-TYPHOIDAL)

I. DISEASE REPORTING

A. Legal Reporting Requirements

A report to the health authority may be made by telephone; telecopy (in the form prescribed by the health authority); or any form of electronic communication identified by the health authority, following the specified format and procedure.¹

1. *Health Care Providers and Health Care Facilities*

Health providers and facilities must notify the health authority where provider is located within the first working day after identifying the case.¹⁻³

2. *Laboratories*

Laboratories must notify the health authority within the first working day after identifying the case.¹ If the lab is located outside of Nevada, notify the Nevada Chief Medical Officer through the Office of State Epidemiology (OSE) within the same timeframe.^{1,4}

3. *Local Health Authority (LHA)*

LHA's must notify the Office of State Epidemiology (OSE) within 7 days after completing the case investigation.⁵

II. THE DISEASE AND ITS EPIDEMIOLOGY

A. Background

Salmonellosis infections can range from mild symptoms to severe gastroenteritis. It is one of the leading cause of foodborne illnesses, hospitalizations, and deaths in the United States.⁶ Infections tend to rise during the summer months and are more severe with higher mortality rates in infants, elderly people, people with hemoglobinopathies (including sickle cell disease), and those with immunocompromised conditions (e.g., cancer, HIV infection).^{6,7} Infections can be sporadic, however, there has been a rise in cases that are linked to multistate outbreaks involving backyard poultry, foods, and pets (reptiles or amphibians).

B. Etiologic Agent

Salmonella are gram-negative bacilli. There are more than 2,500 serotypes, but *S. enterica* is responsible for most infections in humans and other warm-blooded animals. From 2017-2021, *Salmonella* serovars Enteritidis, Newport, Typhimurium, and Javiana accounted for almost half of all reported human isolates in the United States.⁷

C. Description of Illness

Salmonella infections can range from being asymptomatic to urinary tract infections, bacteremia, and focal infections (including meningitis, brain abscess, and osteomyelitis).

The most common symptoms are gastroenteritis with diarrhea, abdominal cramps, fever, nausea, and often times vomiting.^{7,8}

D. Disease Burden in Nevada

In Nevada, the incidence of salmonellosis has varied over time. From 2003 to 2010, the states crude incidence rate of laboratory confirmed cases ranged from 7.2 to 10.3 per 100,000 population. Notably, rates from 2006 through 2010 exceeded the Healthy People 2010 objective of not surpassing 6.8 cases per 100,000 population. However, in 2011 and 2012, Nevada's incidence rates declined to 6.1 and 6.3 per 100,000 population, respectively, aligning with the Healthy People 2020 objective of not exceeding 11.4 cases per 100,000 population.⁹

See the [Nevada Office of State Epidemiology Communicable Disease Dashboard](#) for Nevada specific data on Salmonellosis (enteric section).

E. Reservoirs

Reservoirs range from livestock (e.g., swine, cattle), pets (e.g., dogs, cats, guinea pigs, hedgehogs), poultry (e.g., chickens, ducks, geese, turkeys) and other birds, rodents (e.g., hamsters, mice, rats), wild mammals, reptiles (e.g., turtles, iguanas, snakes), and amphibians (frogs, toads). Humans (those with diarrhea or convalescent carriers) can also serve as a reservoir.⁸

F. Modes of Transmission

Transmission mostly occurs through fecal-oral and vehicle borne routes. Person-to-person is not as common but can occur. Common sources of infection include:

- Contaminated food: most infections are linked to chicken, fruits, pork, seeded vegetables (e.g., tomatoes), other produce (such as nuts), beef, and turkey. Any food can become contaminated, even processed foods (such as flour).
- Cross-contamination: foods that are contaminated with *Salmonella* can spread the bacteria to other foods if they are not separated. Things like unwashed hands, cutting boards, and knives can be a vehicle for bacteria to spread.
- Foods linked to outbreaks:
- Contaminated water: *Salmonella* can contaminate drinking, irrigation, and recreational water. If water contaminated with *Salmonella* is for irrigating or cleaning produce, it can spread to the fruits and vegetables before or after harvest. People can also become infected by drinking untreated water from streams, ponds, and lakes.
- Contact with animals: pets and other animals can carry *Salmonella*. Bacteria can be spread through animal feces, belongings (e.g., toys and bowls), or habits (e.g., beds, cages, tanks, coops, stalls, or barns). People can be exposed at petting zoos, farms, fairs, and at schools/daycares.
- Contact with people: bacteria can be spread by coming into contact with diarrhea through unwashed hands or sexual contact.¹⁰

G. Incubation Period

The incubation period is usually 12-36 hours, but can range from 6 to 72 hours.⁸

H. Period of Communicability

Cases are infectious as long as organism is excreted in feces; this can range from days to months. Rarely, certain serotypes can be excreted for more than a year.⁸

I. Testing

Culture (e.g., stool, urine, blood) is the gold standard. Antimicrobial susceptibility testing should be obtained to provide guidance if treatment is needed. If using a PCR multiplex or other culture-independent diagnostic test (CIDT), reflex culturing is recommended to use for antimicrobial susceptibility testing. Serologic testing unreliable and not recommended.⁷ All positive cultures for *Salmonella* must be forwarded to Nevada State Public Health Laboratory (NSPHL). NSPHL can culture and genetically sequence - whole genome sequencing (WGS) for cluster and outbreak investigations (<https://med.unr.edu/public-health-lab/about/clinical-analysis/culture-stool>).

J. Treatment

Supportive (fluid and electrolyte replacement; If invasive, start initial dose of ceftriaxone and obtain susceptibilities. Appropriate antimicrobial therapies include azithromycin, ampicillin/amoxicillin or trimethoprim-sulfamethoxazole. Fluoroquinolones may be used in more severe or disseminated cases requiring hospitalization.⁷

III. EPIDEMIOLOGIC CASE INVESTIGATION

The public health authority should begin investigating the case of Salmonellosis, step by step, within one working day of notification or in alignment with [NAC 441A](#).

A. Step 1: Review relevant information about the disease.

1. *Review scientific information in [Control of Communicable Diseases Manual](#), most recent edition.*
2. *Review [Salmonellosis most recent case definition \(2017 CDC\)](#).*

B. Step 2: Begin investigating the case.

1. *Contact Reporting Source and/or Reported Case*

Upon receiving an initial case report, review lab test results and available clinical details and epidemiologic factors. Please make three attempts to contact the case (text and phone calls) on separate days, at different times of the day (morning, afternoon, late afternoon). Document all attempts to contact a reporting source and/or reported case, preferably in the "Encounters" tab of EpiTrax. Please use case report forms (CRF) to gather accurate information about the case. Focus on the key data elements listed above. Filling out an electronic version of the CRF in EpiTrax (called a Confidential Morbidity Report (CMR) in EpiTrax) is preferred. If used, the completed PDF version should be attached to the CMR in EpiTrax. The CRF should be completed within 7 days of completing the investigation of the case.⁵

C. Step 3: Identify potential sources of infection

Obtain food history for 7 days before onset of symptoms. Note brand, purchase, and source of high-risk foods. Also ask about any potential exposures during the 7 days prior to onset of symptoms, including:

- Any contacts or household that have similar symptoms. Obtain name and contact information.
- Restaurant/outside of home dining, obtain date, location, and meal if possible. This also includes any public gathering where food was consumed.
- Consumption of raw or undercooked meat, poultry, or eggs.
- Consumption of raw milk or other unpasteurized dairy products.
- Travel outside of Nevada or the United States, gather date and location information.
- Contact with any pet, livestock, or other animals (including farms and petting zoos).
- Contact with any reptiles or amphibians and their habitats.

Once investigator collects information from restaurants, compile list and give to the Rural Disease Investigator Specialist (DIS) Supervisor. The DIS supervisor will contact Environmental Health Services (EHS) and send over Interjurisdictional Notification Forms for each restaurant.

D. Step 4: Initiate control measures for case and/or for contacts (see Section IV – Section VI below).

E. Step 5: Provide Education and Prevention messaging to the case and/or contacts (see Section IX below).

IV. CONTROL OF CASE

1. *Management/Exclusions for Specific Groups or Settings⁷¹*

Guidance for Cases	
Healthcare Workers	Consult with employer's infection control staff, facilities often have their own procedures for clearance for return to work. If none exist, utilize exclusion process below: Exclude symptomatic cases from work until case has 2 negative stool tests (collected at least 24 hours apart AND 48 hours after cessation of antimicrobial therapy). OR case is asymptomatic; risk of transmission is negligible; AND no indication of poor personal hygiene. <i>Healthcare workers who prepare food should be managed as food handlers.</i>
Food Handlers Serving Highly Susceptible Populations (e.g., hospitals,	Exclude cases from work until case has 2 negative stool tests (collected at least 24 hours apart AND 48 hours after cessation of antimicrobial therapy).

child care center, nursing home	
Food Handlers in Establishments Serving the General Population	Exclude or restrict symptomatic cases from work until case has 2 negative stool tests (collected at least 24 hours apart AND 48 hours after cessation of antimicrobial therapy). OR case is asymptomatic; risk of transmission is negligible; AND no indication of poor personal hygiene.
Childcare Workers	Exclude until diarrhea has stopped for 24 hours and they are otherwise feeling better. <i>*Childcare workers who prepare food should be managed as food handlers.</i>
Childcare/School Attendees	Exclude until diarrhea has stopped for 24 hours and they are otherwise feeling better.
Case in a Medical Facility	Case should be cared for using standard precautions. Contact precautions may be used for diapered or incontinent persons for duration of illness.
General Population	No exclusions or stool specimens required. Provide prevention education.

2. *Exclusion Notification*

- Consult with communicable disease supervisor or epidemiologist to verify that case meets CSTE case definition.
- Obtain employer information and complete the exclusion notification letter and have signed by Rural Disease Investigator Specialist (DIS) Supervisor. Email copy of the signed letter to the case to give to their employer. If unable to print out, OSE will mail a copy of the letter to the case. Once the case meets return to work criteria, complete the release letter and have signed by Rural DIS Supervisor. Email the signed letter to the case to give to their employer.
- If the case is a healthcare worker, consult with communicable disease supervisor or epidemiologist. Notify infection prevention staff of diagnosis, most facilities handle their own worker exclusions and may have more stringent return to work criteria. Let the facility know that OSE is available to provide any assistance.
- If the case is in a childcare facility, contact the facility director and provide education of proper hand washing techniques and any infection control messaging.

3. *Additional Testing for Return to Work*

Work with the original ordering provider and inform them of the additional testing needed for the case to meet the return-to-work criteria.

V. CONTROL OF CONTACTS

1. Investigate symptomatic contacts in the same manner as a case.

2. A household contact shall not work in a sensitive occupation (food, medical, or childcare) unless:
 - Has submitted at least one fecal specimen for examination by a medical laboratory; OR
 - Asymptomatic and no indication of poor personal hygiene.
3. If fecal specimen is positive for a *Salmonella* species, treat as a case and subject to exclusion criteria.

VI. CONTROL OF CARRIERS

Any case that has been identified as a carrier working in a sensitive occupation will be informed of the testing requirements for release to return to work. Follow exclusion notification above. Work with the ordering provider to coordinate appropriate testing requirements.

Types of Carriers in Sensitive Occupations	Exclusion
Convalescent Carrier (excretes <i>Salmonella</i> for not less than 4 weeks but not more than 1 year after acute onset)	2 consecutive negative fecal specimens (taken at least 24 hours apart) fail to show <i>Salmonella</i> species.
Chronic Carrier (excretes <i>Salmonella</i> for >1 year after acute onset)	3 consecutive negative fecal specimens (taken at least 72 hours apart) fail to show <i>Salmonella</i> species.

VII. MANAGEMENT OF SPECIAL SITUATIONS/OUTBREAK CONTROL

Coordinate with senior epidemiology staff to determine if an outbreak is occurring. If so, notify DPBH Environmental Health, local health authorities, or infection control, as appropriate.

VIII. PREVENTION¹²⁻¹⁴

- Wash hands for at least 20 seconds with soap and warm water before, during, and after preparing food and before eating.
 - Always wash hands after handling raw meat, chicken and other poultry, seafood, flour, or eggs
- Wash utensils, cutting boards, and countertops with hot, soapy water after preparing food.
- Rinse fresh fruits and vegetables under running water.
- Separate raw meat, chicken and other poultry, seafood, and eggs from other foods in shopping carts and in the refrigerator.
 - Store raw or marinating meat, poultry, seafood in sealed containers or wrap them securely.
- Avoid unpasteurized milk and other unpasteurized products including soft cheeses.

- Use one cutting board or plate for raw meat, poultry, and seafood and a separate cutting board and plate for produce, bread, and other foods.
- Raw chicken does not need to be washed first, bacteria can spread to other foods, sink, and the counter.
- Use a food thermometer to ensure foods are cooked to safe internal temperatures.
 - Eggs should be cooked until yolk and white are firm
 - Whole cuts of beef, veal, lamb, and pork (including ham): 145°F
 - Fish with fins: 145°F or until flesh is opaque and separates easily with a fork
 - Ground meats (e.g., beef or pork): 160°F
 - All poultry, including ground chicken and turkey: 165°F
 - Leftovers and Casseroles: 165°F
- Bacteria multiply quickly if left at room temperature or in the “Danger Zone” between 40° and 140°F. Never leave perishable food out for more than 2 hours.
 - Refrigerate perishable food (meat, seafood, dairy, cut fruit, some vegetables, and cooked leftovers) within 2 hours. If food is exposed to temperatures above 90°F, refrigerate within 1 hour.
 - Thaw frozen food safely in the refrigerator, in cold water, or in the microwave.
- Wash hands after using the restroom; after changing diapers; after contact with animals or their food or waste; and before, during, and after food preparation.
- Wash hands after handling pets, pet waste, treats made from animal products, fowl, other animals, raw meat, raw poultry, and always before food preparation.
- Wash hands after caring for diapered children, after using the toilet, and after handling soiled clothing or linens.
- Avoid drinking or swallowing untreated surface water. Untreated water should be boiled and disinfected.
- Discourage using chicks, ducklings, turtles, reptiles, or rodents as pets for small children.
- Avoid direct or indirect contact between reptiles and infants or immunocompromised persons.
- Practice food and water safety while traveling.
 - Avoid eating raw foods, street food, and bushmeat.
 - Avoid drinking tap water, do not swallow water when showering and use bottled water while brushing teeth. Do not use ice in destinations with limited access to drinking water.
 - Drink bottled or canned drinks. Carbonated drinks in bottles or cans are typically safe. Avoid drinks that have ice.
 - Hot drinks that are served steaming are typically safe.
 - Drink pasteurized milk only.

The [Nevada OSE website](#) also provides information about salmonellosis.

IX. REFERENCES

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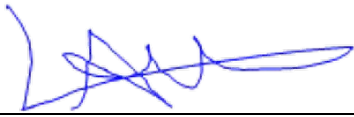
X. ACKNOWLEDGEMENTS

This document was developed based on the content and format of the disease investigation guidelines of several state and local health jurisdictions:

- Oregon Health Authority Investigative Guidelines
- Washington State Department of Health Reporting and Surveillance Guidelines
- Washoe County Health District Epidemiology and Communicable Disease Program Investigation of Communicable Disease Manual

The Nevada Office of State Epidemiology would like to acknowledge the work of these great partners.

XI. UPDATE LOG



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7/31/26

Chief Medical Officer Approval Date